IN THE U.S. PATENT AND TRADEMARK OFFICE

APPLICANTS:

Fujimori Kogyo Co., Ltd.

MITANI SANGYO CO., LTD.

ACT-T Corporation

FOR:

SELF-STANDING BAG AND METHOD OF MANUFACTURING THE BAG

D E C L A R A T I O N

Honorable Commissioner of Patents

Washington, D.C. 20231

Sir,

I, Takashi Kojima, a patent attorney of Ginza Ohtsuka Bldg., 2F, 16-12, Ginza 2-chome, Chuo-ku, Tokyo, Japan do hereby solemnly and sincerely declare:

1) THAT I am well acquainted with Japanese language and English language;

2) THAT the attached is a full, true and faithful translation into English made by me of the PCT application

of which number is PCT/JP02/13587, filed in Japan on the 26 December 2002.

3) THAT I declare further that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patent issued thereon.

AND I being sworn state that the facts set forth above are true.

Dated this 22nd day of June 2004

Takashi Kojima

Takashi KOJIMA

DESCRIPTION

SELF-STANDING BAG AND METHOD OF MANUFACTURING THE BAG

TECHNICAL FIELD

The present invention relates to a self-standing bag having a spout, and more particularly to a self-standing bag that is flexible and has good self-standing performance and high fixing strength of the spout.

BACKGROUND ART

Conventionally, self-standing bags for fluids in which a liquid is filled have been used mainly for refilling use, and little attention has been paid to the self-standing performance. Therefore, when the amount of the content has been decreased, for example, to 1/3 or less of the initial amount, the conventional self-standing bag loses its self-standing function because of bending at the upper portion of the bag. Particularly, a self-standing bag for a fluid may have a spout for pouring the content. In such a case, the upper portion of the bag becomes heavy and the self-standing performance may be considerably injured. In addition, the conventional self-standing bag having a spout has been formed by a method in which peripheral edges of a bag body are sealed by fusion bonding, the spout is separately molded, and the molded spout is manually inserted between sheets constituting the bag body to fusion bond to the inner surfaces of the sheets, thereby attaching the spout to the bag. Such a manual operation not only affects the mass-productivity, but also renders the fusion bonding between the spout and the sheets unsatisfactory, resulting in an insufficient strength of the bag body. On the other hand, molded vessels naturally have a sufficient self-standing performance, but they cannot be reduced in size by folding at the time of disposal.

DISCLOSURE OF INVENTION

The present invention has been made under the above circumstances. Accordingly, it is an object of the present invention to provide a self-standing bag which maintains the self-standing performance until the content is used up, can be reduced in volume by folding in case of disposing of the bag, and has a high fixing strength of a spout, and a method of manufacturing such a self-standing bag.

According to the present invention, there is provided a self-standing bag having a spout at an upper portion of a bag body, characterized in that both side edges and an upper edge of the bag body are sealed by an edge sealer made of thermoplastic resin which covers the outer surfaces of said edges, and the edge sealer is integrally molded with the spout. In this case, it is more preferable that the edge sealer of the bag body and the spout are formed by injection molding.

According to the present invention, there is also provided a method of manufacturing the above-mentioned self-standing bag, characterized in that, in case of forming the edge sealer of the bag body, a cavity is formed in a mold at the places corresponding to the edges of the bag body, and then a thermoplastic resin is injected into the cavity to seal the edges of the bag body, thereby forming the edge sealer. In this case, it is more preferable that, in case of forming the edge sealer of the bag body, a die slide injection system is used in which one cavity in the shape of a half part of the edge sealer is formed in the mold at the place corresponding to one surface of the edges of the bag body, a thermoplastic resin is injected into the cavity to mold the half part of the edge sealer, then another cavity in the shape of the remainder part of the edge sealer is formed in the mold at the place corresponding to the other surface of the edges of the bag body, and a thermoplastic resin is injected into the cavity to mold the remainder part of the edge sealer to seal the edges of the bag body, thereby forming the edge sealer.

The self-standing bag according to the present invention has a structure in which the upper edge and both the side edges of the bag body are sealed by the edge sealer made of a thermoplastic resin which covers the outer surfaces of the edges. Therefore, the edge sealer at the respective edges can constitute ribs of the bag body to function as support of the bag, thereby enhancing the self-standing performance of the bag body. A sufficient self-standing performance can be maintained until the contents are consumed completely, although the spout is provided at the upper portion of the self-standing bag. Since the spout is integrally molded with the edge sealer, the fixing strength of the spout to the bag is excellent.

It is more preferable that the edge sealer of the bag body and the spout are formed by injection molding, because it is possible to form the edge sealer and to simultaneously perform integral molding of the spout easily and securely by, for example, the die slide injection system.

The method of manufacturing the self-standing bag according to the present invention is characterized in that, in case of forming the edge sealer of the bag body, cavities are formed in a mold at the places corresponding to the edges of the bag body, and a thermoplastic resin is injected into the cavities to seal the edges of the bag body, thereby forming the edge sealer. In the manufacturing method, for example, in case of forming the edge sealer of the bag body of the self-standing bag, a die slide injection system is used in which one cavity in the shape of a half of the edge sealer is formed in the mold at the place corresponding to one surface of the edges of the bag body, a thermoplastic resin is injected into the cavity to mold a half part of the edge sealer, then another cavity in the shape of the remainder part is formed in the mold at the place corresponding to the other surface, and a thermoplastic resin is injected into the cavity to mold the remainder part of the edge sealer to seal the edges of the bag body, thereby forming the edge sealer. According to such a method, it is

possible to arrange the edges of the bag body securely at the center of the resin (the center of the edge sealer) and to seal the edges of the bag body more easily and securely, in case of covering the outer surfaces of the edges of the bag body with the thermoplastic resin, as compared with the case of conducting, for example, one-stage injection molding for forming the edge sealer by injecting the thermoplastic resin so as to cover the outer surfaces of the edges of the bag body disposed in a mold in the condition where sheets overlap on each other.

The self-standing bag according to the present invention is flexible and has good self-standing performance, so that the bag functions as a self-standing packing bag and fulfills the self-standing performance until the contents are completely consumed upon use in spite that the spout is attached, and the bag can be disposed by rolling up the bag with a reduction in volume after the completion of use. Further, the self-standing bag is high in fixing strength of the spout to the bag. Therefore, the self-standing bag according to the present invention is easy to use, and is easy to reduce in volume in case of disposing of the bag after the completion of use, which is suited to environmental protection. According to the method of manufacturing a self-standing bag of the present invention, the self-standing bag having the above-mentioned characteristics and particularly having an excellent seal strength of the bag body can be manufactured easily and securely.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a schematic perspective view of a self-standing bag for illustrating an embodiment of configuration of the self-standing bag according to the present invention.

FIG. 2 is a schematic front view of the self-standing bag.

FIG. 3 is a schematic diagram showing an injection mold for illustrating an embodiment of the method of

manufacturing a self-standing bag according to the present invention.

FIG. 4 is a schematic diagram showing the injection mold.

FIG. 5 is a schematic partial view of the injection mold.

FIG. 6 is another schematic partial view of the injection mold.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention will be described more in detail below, referring to the drawings. FIG. 1 and FIG. 2 illustrate one embodiment of configuration of the self-standing bag according to the present invention, in which FIG. 1 is a schematic perspective view showing the condition where the self-standing bag 1 is expanded, and FIG. 2 is a schematic front view showing the condition where the self-standing bag 1 is folded. The self-standing bag 1 has a spout 3 at an upper edge of a bag body 2, a long film constituting the bag body 2 is piled by folding the film in four at the lower portion thereof, and one side edge 2a, the upper edge 2b, and the other side edge 2a of the folded film are sealed as described later, whereby a bottom portion 2c is formed.

The bag body 2 is formed from a monolayer or multilayer film. These films may not necessarily have a fusion-bondability, which has been required for the conventional films. It is preferable, however, that the film surface which is to become an outer surface of a bag has a good adhesion with a resin to be injected for forming an edge sealer. The multilayer film is a co-extruded film, a laminate film, or the like. An oriented or unoriented polyolefin, nylon, polyester film, or a film for imparting required functions to the resin layer including a co-extrusion type film with a gas barrier layer (EVOH, saran, ceramic vapor deposition, etc.) or a laminate type film thereof is suitably used.

The thickness of the film is 20 to 900 μm. From the viewpoint of self-standing property, a thick film is suitable. From the viewpoint of flexibility and light-weightness, a thin film is used. Even a thin film can secure the self-standing property by forming the edge sealer. In view of moldability and handleability, the film thickness is preferably 100 to 200 μm. The film is not limited to those made of synthetic resin, and may be a monolayer or laminate film of paper or metal foil.

The spout 3 is not particularly limited as to shape and size thereof. The spout 3 can have arbitrary shape and size according to the purpose of use of the packing bag. Generally, a self-standing bag with a spout is manufactured by inserting the spout into the upper edge of the self-standing bag by a separate operation using hands or an automatic inserting machine, followed by fusion bonding. Therefore, when the thickness of the spout is large, it is difficult to adhere tightly in the both side of the spout to the bag, and the fusion operation involves difficulties in many cases. On the other hand, in the present invention, such difficulties are obviated because the spout is injection molded integrally with the edge sealer 4, as will be described later.

The edge sealer 4 is simultaneously and integrally molded with the spout 3 by injection molding, or is integrally molded in a mold with a preliminarily molded spout 3. The resins for forming these parts are not particularly limited, inasmuch as they can be injection molded and can seal the edges of the bag body 2. Examples of the resins utilized include not only polyethylene and polypropylene reins, which are general-purpose resins, but also injectable plastics, for example, blends or copolymer of nylon, polyester, various engineering resins, elastomers, etc.

The edge sealer 4 are so shaped as to conform to the one side edge 2a, the upper edge 2b, and the other side edge 2a of the bag body 2 composed of the resin film preliminarily formed into the shape of a predetermined self-standing bag.

The edge sealer 4 is not particularly limited as to width and thickness. It is preferable, however, that the width (arrow w in FIG. 1) is 1 to 20 mm, particularly 5 to 10 mm, and the thickness (arrow d in FIG. 1) is 1 to 10 mm, particularly 2 to 5 mm. Where the width is too small or the thickness is too small, it may be impossible to obtain a sufficient seal strength. Where the thickness is too large, the amount of resin used is increased, which is unfavorable from the viewpoint of disposal properties. Where the width is too large, it may be difficult for the self-standing bag to have a sufficient internal volume.

The method of manufacturing the self-standing bag 1 is not particularly limited. It is preferable to manufacture the self-standing bag 1 by using an injection molding machine A capable of in-mold molding and insert molding. As shown in FIGS. 3 and 4, the machine A includes a first mold 5 for forming between an upper half mold 5a and a lower half mold 5b a cavity for forming a half part of the edge sealer on one surface of the edges of a bag body and forming the spout at a predetermined position of the upper edge of the bag body, and a second mold 6 for forming between an upper half mold 6a and a lower half mold 6b a cavity for forming the remainder part of the edge sealer on the other surface of the edges of the bag body, in which the upper half molds 5a and 6a are provided respectively with injection ports 7, 7, and which is of the die slide injection system having such a structure that the first mold 5 and the second mold 6 are slidable. By using a resin film 2' which is preliminarily formed and folded so as to have a predetermined self-standing bag shape, the bag can be prepared as follows.

First, as shown in FIG. 3, the resin film 2' is set on the lower half mold 5b of the first mold 5, then the upper half mold 5a is moved downwardly, and a tapered tip end 8a of a slide core 8 for forming the spout is inserted between the films at one end part 2'a for constituting the upper edge of the bag body, while the part folded in four of the other end part 2'b for forming the bottom portion of the bag body is

set to be piled as if the bottom portion becomes one sheet. After such a setting, a resin is injected to the peripheral edges except the end edge of the bottom portion, whereby the expandable bottom portion is formed. Specifically, with the upper half mold 5a moved downwardly, a cavity 9a in the shape of a half part of the edge sealer is formed in the lower half mold at the places corresponding to the upper peripheral edge and the side peripheral edges of the bag body, as shown in FIG. 5, fronting on the one end part 2'a and the both side edges (not shown) of the resin film 2'. Then, by use of the injection port 7 provided in the upper half mold 5a, an ejection mechanism (not shown) provided in the lower half mold 5b, and a vacuum drawing mechanism connected to the cavity, a molten thermoplastic resin is injected into the cavity of the first mold 5 to mold the spout at a location to become a predetermined position of the upper edge of the bag body, and simultaneously to achieve primary molding of the half part 4a of the edge sealer on one surface of the portions corresponding to the upper edge and the both side edges of the bag body, as shown in FIG. 5. Next, the second mold 6 is slid, and the thermoplastic resin is similarly injected into the cavity 9b of the second mold 6 as shown in FIG. 6, to achieve secondary molding of the remainder part 4b of the edge sealer on the other surface of the above-mentioned portions and to seal the portions corresponding to the upper edge and the both edges of the bag body, thereby forming the edge sealer 4 and manufacturing the self-standing bag.

When the edge sealer 4 is formed in two stages as described above, the sealing can be achieved in the condition where the edges of the resin film 2' are clamped between the central portion of the edge sealer, while obviating the problem that the overlapping edges of the resin film 2' so folded as to have a bag body shape would be opened by the thermoplastic resin injected into the cavity and the problem that the film edges would be distorted in one direction in the overlapping state.

The self-standing bag is preserved and transported, after the contents (not shown) are charged into the bag through the spout, the bag is set into a self-standing shape with the bottom portion expanded and the spout is sealed. Upon use, the contents can be discharged from the bag through the spout. The kind of the contents is not particularly limited, but a fluid material is preferred as the contents. For example, liquids, viscous materials, powders, small-diameter particles and the like can be preferably contained in the bag. Since the edge sealer at the both side edges function as ribs, the self-standing bag can maintain the self-standing property until the contents thereof are consumed completely, and can be reduced in volume by rolling up at the time of disposal.

Incidentally, the present invention is not limited to the above-described constitution, and various modifications are permitted without departure from the gist of the invention.

For example, according to such conditions as the flexibility of the film and the moldability of the resin, the molding may be carried out in one stage. In place of sliding the mold as mentioned above, a system may be adopted in which slidable pins are provided in the mold, injection is conducted to an intermediate stage in the condition where the edges of the bag body are clamped by the pins so as to be located at the center of the edge sealer, then the pins are retracted by sliding, the remainder of resin is injected to fill up the void portions where the pins have been present, thereby molding the edge sealer in a predetermined thickness to seal the edges of the bag body, followed by fixation.

As to the spout, a variety of selections can be made. For example, a cap to be sealed by a screw or a cap capable of being opened and closed with a hinge may be used, and a spout provided with a nozzle for taking out the contents by suction may be used.

Furthermore, as to the shape of the bag body, a variety of deformed bag designs may be adopted, inasmuch as

the self-standing function through the spreading of the bottom is not spoiled.